NATIONAL STANDARD FOR BIODIESEL- DISCUSSION PAPER

EPA VICTORIA COMMENTS

INTRODUCTION

EPA Victoria supports the development of mandated national fuel quality standards for biodiesel. Such a standard is important for a number of reasons:

- it ensures that the fuel quality doesn't undermine the emissions performance and operability of the vehicle;
- it provides certainty to the biodiesel industry; and
- it provides consumers with confidence that their vehicles will operate cleanly and reliably.

Recent concern surrounding ethanol has served to undermine consumer support and has reduced commercial incentives to use this biofuel.

Vehicle technology and emission standards used in Australia are based on international standards, primarily derived from Europe. In order to ensure that vehicles can meet these standards during normal operation, the fuel standards introduced in Australia since 2002 for diesel and petrol have also been based on international standards. It is therefore logical that when new Australian biodiesel standards are set, existing overseas standards are utilised wherever possible.

When the petrol and diesel standards were developed, they were altered to allow for specific Australian conditions and considerations. EPA believes a similar approach should be taken with the biodiesel standards, harmonising where appropriate but allowing for some adjustment to take into account local considerations.

On many parameters, the European and US biodiesel standards are in agreement, and EPA supports the adoption of these standards where that is the case. However, as the European standards cover a wider range of parameters than the US standards, they appear to represent a more comprehensive approach. As the majority of vehicle emission and fuel standards to date are based on European standards, it appears that European biodiesel standards should be the starting point for the development of Australian standards.

Summary

- EPA Victoria supports the development of mandated national fuel quality standards for biodiesel.
- As the majority of vehicle emission and fuel standards to date are based on European standards, it appears that European biodiesel standards should be the starting point for the development of Australian standards.

BIODIESEL FEEDSTOCKS

While EPA supports the use of the European standard as the starting point for the Australian standards, it is recognised that a number of restrictions have been built into these standards to reflect common practice in Europe. For example, the European standards only allow for the use of methanol as the reacting alcohol and they also specify iodine number, which acts to limit feedstock to canola oil.

It is recognised that biodiesel can be derived from a wide variety of feed stocks including re-cycled cooking oils, tallow as well as virgin oil from specially grown crops. Provided that biodiesel producers meet the fuel standards, and also adhere to any other State based requirements for production facilities and the transport and sourcing of feedstocks, then a specific requirement on feedstocks and production techniques does not appear necessary.

Both ethanol and methanol can be used in the production of biodiesel. While the European biodiesel standard favours the use of methanol, Australia has wider access to ethanol that has been produced from renewable resources and EPA would not support the setting of standards that preclude either alcohol. Issues surround the use of both alcohols, and the standards should be set to ensure that no excess levels of these alcohols remain in the final fuel.

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BIODIESEL BLENDS

Biodiesel is used at different levels across the world, from B3 blends in order to provide lubricity right through to pure B100 blends. In the USA the majority of blends are B20 while in Europe, Germany uses B100 while Italy and France use B5.

In Australia, the existing tax system provided B100 with excise free status, but treated any blends as 100% diesel and therefore taxable. This effectively prevented the use of biodiesel blends in Australia.

The use of biodiesel blends appears to have a number of benefits over B100. Firstly, the biodiesel provides lubricity to the normal diesel, an issue that becomes more important with low sulfur fuels. Data in the discussion paper also suggests that B20 blends provide significant reductions in hydrocarbon, CO and particle emissions over standards diesel.

The CSIRO lifecycle assessment noted that B100 would allow all emission standards to be met from vehicles, except for NOx for ADR 80/00 and ADR 80/01. The emissions results for B20 detailed in the discussion paper indicate that there is a 3% increase in NOx emissions compared with standards diesel, but this is presumable lower than the NOx increase from B100.

The use of biodiesel blends also helps reduce issues surrounding viscosity of neat biodiesel, and also minimises the perceived fuel economy loss that is associated with pure biodiesel.

The use of biodiesel blends also has a number of consumer awareness and acceptance benefits. Blending a biodiesel into standard diesel introduces this biofuel to a wider consumer base, increasing its acceptance without the perceived risk of using a 100% new fuel.

Finally, blends help reduce pricing fluctuations that can flow from crop based fuels such as biodiesel. When the recent drought hit, the cost of canola rose dramatically, therefore increasing the cost of biodiesel. At least one Victorian bus operator that was using B100 went back to normal diesel at this time due to the increased costs. However, blends would not be so susceptible to such dramatic fluctuations in costs due to droughts.

The changes to the fuel tax system announced in the recent budget will see biodiesel excised at the same rate as diesel, but this excise will be offset with grants until 2012. These changes also will allow the biodiesel component of blends to be effectively excise free, increasing the attractiveness of blends.

EPA does not support the setting of minimum or maximum levels of biodiesel in blends, indeed there are applications where B100 would be preferable to traditional diesel or diesel blends due to it's greater biodegradability.

EPA generally supports the European approach of setting one standard that applies whether a biodiesel is used as a neat fuel, or as a blending agent. It could be assumed that if the blend stock levels are set appropriately, there is no need to set standards for final blends. However, this approach necessitates that the biodiesel standards are set as close to the traditional diesel standards as possible in order to guarantee that the overall blend of fuel will retain desirable physical and chemical characteristics, regardless of the level of biodiesel substitution.

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SPECIFIC COMMENTS ON BIODIESEL PARAMETERS

Sulfur

EPA Victoria supports the setting of a sulfur standard for biodiesel. It is understood that the sulfur level in biodiesel is dependent on the particular feedstock, with certain recycled wastes having levels of up to 40 ppm while certain virgin crops are as low as 10ppm.

While 10ppm sulfur is expected to be the diesel standard from around 2009/10, in the interim it appears appropriate that the biodiesel standard is set at 50ppm. This allows for the use of a number of different feedstocks and is in line with the normal diesel fuel standard due from 2006. Once normal diesel standards are set at 10ppm, the biodiesel standards should be harmonised.

Carbon Residue

Excess deposits and wear on fuel injectors have been demonstrated by the Diesel NEPM to result in excessive vehicle emissions. The discussion paper indicates that a high carbon residue level accelerates the wear of injectors and is therefore a very important parameter. In addition, the setting of a carbon residue standard provides a good control on undesirable residues within biodiesel. However, it is difficult to determine the relative stringencies of the US and European standards as they are measured at different distillation periods and EPA Victoria cannot indicate which one is preferred or appropriate.

Ester Content

If the ester content is too low, it indicates that there are un-reacted feedstock oils in the biodiesel. This can result in high viscosity, leading to carbon deposits on the injector tips and poor spray patterns from the injector, potentially increasing emissions. Low ester content also indicates potential cold filter plugging point (CFPP) issues, engine deposit issues and excess alcohol issues. As such, EPA Victoria would support the setting of a minimum ester content in line with the European standard.

Kinematic Viscosity

High viscosity can cause injector spray pattern problems that can lead to coking and oil dilution. Poor fuel spraying can potentially lead to incomplete combustion and excessive emissions. The biodiesel viscosity standard should be aligned as closely as possible with the normal diesel viscosity standards in order to ensure that engines can operate correctly and efficiently, regardless of the biodiesel content of the fuel.

The European biodiesel standard is a more tightly controlled standard, allowing between 3.5 and 5 mm^2/s, whereas the US standard ranges between 1.9 and 6 mm^2/s. EPA Victoria supports the use of the European standards, which is understood to be more closely aligned with the normal diesel standard.

Cetane Number

It is understood that a higher cetane number improves ignition, operation and reduces knocking characteristics. Low cetane numbers lead to misfiring, engine deposits and rough running. However, it is understood that high cetane numbers can lead to emissions of white smoke.

The US standard specifies a cetane number of 47, whereas the European standards specifies a cetane number of 51. EPA Victoria would support the adoption of the European number, assuming that this is not so high as to result in emissions of white smoke.

Total Contamination

A total contamination standard controls the residual levels of contaminants following the process of 'ester washing' during fuel production. If not controlled, these contaminants lead to potential issues with engine deposits, ash levels and storage stability.

The discussion paper indicates that the US does not set a total contamination standard as it only allows alkaline catalysts to be used. As some Australian manufacturers have indicated the desire to use acid catalysts, EPA Victoria would support the setting of a total contamination standard, base on the European standard.

Acid Value

The acid value measures the amount of free acids in the fuel after processing. A high acid level can result in fuel system damage and may also accelerate fuel degradation.

Based on the information provided in the discussion paper, EPA Victoria supports the setting of an Australian standard based on the European standard.

Iodine Number

It is understood that the European iodine number is set at a level to prevent the importation of soya beans into Europe. EPA would not support the setting of a standard that was designed to limit choice in feedstocks.

Linoleic Acid Methyl Ester and Polyunsaturated Methyl Esters (>4 Double Bonds)

Based on the information provided in the discussion paper, EPA Victoria supports the setting of an Australian standard based on the European standard.

Mono- and Di-Glycerides

Based on the information provided in the discussion paper, EPA Victoria supports the setting of an Australian standard based on the European standard.

Triglyceride Content

Based on the information provided in the discussion paper, EPA Victoria supports the setting of an Australian standard based on the European standard.

Alkaline Metals

Based on the information provided in the discussion paper, EPA Victoria supports the setting of an Australian standard based on the European standard.

Thermal Stability

As biodiesel is more thermally stable than traditional diesel, and there are no European and US standards for biodiesel thermal stability and the short-term tests are considered unreliable, such a standard appears inappropriate.

Oxidation Stability

Based on the information provided in the discussion paper, EPA Victoria supports the setting of an Australian standard based on the European standard. If the results from the BIOSTAB project determine an alternative limit, then the Australian standards should be amended at that time.

Alcohol Content

The presence of excess methanol not only impacts on flashpoint and storage issues, it has a significant impact on exhaust emissions. The presence of methanol in a fuel can lead to the formation of the air toxic 'formaldehyde' in exhaust emissions.

Based on the information provided in the discussion paper, EPA Victoria supports the setting of an Australian standard based on the European standard.

Cloud Point and Cold Filter Plugging Point

The setting of cloud point and cold filter plugging point standards is important to ensure that diesel vehicles in colder climates can continue to operate. While the discussion paper indicates that no such standards exist for normal diesel, it is understood by EPA Victoria that these standards are due to be considered by the FSCC is the near future.

The setting of biodiesel standards for cloud point and CFPP should be as close to the normal diesel standards as possible to prevent cold weather issues. If the cloud point and cold filter plugging point standards for biodiesel cannot be matched with the equivalent diesel standards, then it may be appropriate to set a standard for the overall blend to ensure that any use of biodiesel in colder climates or seasons does not result in vehicle operational issues.

Density

Based on the information provided in the discussion paper, EPA Victoria supports the setting of an Australian standard based on the European standard.

Flash Point

Flash point controls are important for both fuel safety issues as well as ensuring that excess alcohol is limited. The US standard is set at 130^{o}C in order to limit the presence of excess alcohol, whereas the European standard sets a less stringent standard for flash point, but sets an alcohol measure.

Based on the information provided in the discussion paper, EPA Victoria supports the setting of an Australian standard based on the European standard.

Dissolved Water Content

It is understood that no dissolved water limit is set in the European and US biodiesel standard. It is noted that dissolved water can lead to fatty acid formation and filter plugging. The discussion paper notes that biodiesel can absorb up to 1000ppm of dissolved water during storage, and suggests that any standard below this is unreasonable. No information is provided to indicate

whether 1000ppm dissolved water represents a problem with fatty acid formation and filter plugging.

As the US and Europe do not set a limit, it appears that an Australian standard is not necessary. However, if a standard is to be set in Australia, it should be based on a the level required to prevent fuel problems and filter plugging, not on a level that is chosen to minimise the need for good fuel storage practices.

Compliance Issues and labelling

The introduction of various biodiesel blends may necessitate a review of fuel sampling and analysis techniques. The ability to sample diesel blends at a retail level and attribute each parameter to either the biodiesel or normal diesel fraction of the sample must be assured.

Labelling of biodiesel blends may be necessary, depending on final feedback from manufacturers regarding warrantees. The discussion paper indicates that there may be variance between the feedback from local manufactures on warrantees and the information available from the parent companies. For instance, the information for Volvo cars in Australia suggests that no more than 5% biodiesel should be used, whereas the European information names a number of models that can run on pure biodiesel.